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Research Paper

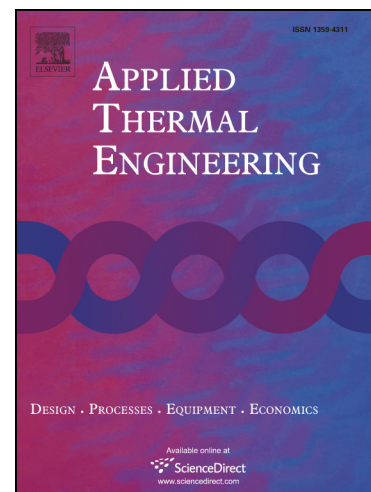
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## Study on the influence of adsorbent particle size and heat exchanger aspect ratio on dynamic adsorption characteristics

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### Abstract

Adsorption heat exchanger comprises of the adsorbent granules/particles packed in between heat exchanging surfaces. The refrigerant vapor flow as well as heat transfer occurs through the adsorbent column. A 2-dimensional transient CFD study is employed to simulate the adsorption dynamics of ethanol vapor on loosely packed activated carbon. The adsorbent chosen for this study is activated carbon and the refrigerant is ethanol. In this paper, the efficacy of the refrigerant vapor transport through the porous adsorbent bed is studied in terms of flow resistance and thermal diffusion along with the mass diffusion through adsorbent particles. Three heat exchanging domains with same area but different aspect ratios (fin height to fin pitch ratio) along with two particle sizes are evaluated. The dynamic uptake predicted by this CFD study shows strong dependency on flow resistance of porous media for smaller particle size whereas a weak dependency on thermal and intra-particle mass diffusion is observed for larger particles. Furthermore, a comparison on the adsorption dynamics predicted by the present CFD study and

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